REPORT

ON THE

HORTICULTURAL GARDEN, LUCKNOW,

FOR THE YEAR ENDING 31ST MARCH, 1880.

Government Press, Allahabad,—1880.

Report on the Horticultural Garden, Lucknow, for the year ending 31st March, 1880.

THIS year's report is drawn up under five main heads, as laid down in Director's review of last year's report.

I.—FRUIT CULTURE.

2. These I will take in the order of merit in which I think they stand. Oranges, Malta.

The Malta I consider the best variety in the garden; it bears well and the fruit is large and well-flavoured; it also comes in early. The unthrifty appearance of the trees mentioned in previous reports still applies. I am, however, hopeful that this may be remedied, and an account of the measures proposed and steps taken to effect this will be found under the sub-divisional heading, "*Improvement of acclimatized kinds.*"

3. With regard to the early distribution of this orange, the garden account books show that plants were sent to the following public gardens:—Partabgarh, 1868; Rae Bareli, 1868; Sultánpur, 1868; Sítapur, 1868; Sítapur Jail Garden, 1868; Unao, 1870; and Botanical Garden, Saháranpur, 1869.

A letter enquiring about the condition and progress, &c., of these trees was addressed to the officer in charge of each of the above gardens; the replies received are as follows:—

Partabgarh.—Twelve trees are now alive; are about 8 feet high; have fruited for the last three years; fruit large and of good appearance, but not so juicy or sweet as country oranges; are planted in ordinary loam, and have received no special treatment.

Rae Bareli.—Only two trees are reported alive, which do not fruit.

Sultánpur.—Eleven are reported alive; are from five to six feet high; have fruited, but not considered so good as that from other kinds received from Lucknow. Trees have had no particular treatment.

Sítapur.—Twenty-three trees are reported alive; have an average height of 14 feet; are healthy and have fruited; fruit considered of average quality, but rather deficient in flavour; planted on "dumat," and had constant irrigation.

Sítapur Jail Garden.—Thirty-seven are said to be alive; average height 12 feet; are healthy and have fruited; fruit considered better than other kinds; planted in sandy soil; have had frequent irrigation.

Unao.—Trees could not be found.

Saháranpur Botanical Garden.—Two trees only are reported alive; owing to being planted in bad soil and position, have come to nothing. It appears, however, that there are a number of trees of this orange in the garden, which are supposed to be about 25 years old, and which yield fruit superior and earlier than any of the other kinds in the garden. The only drawback is that the yield is light, but for this it would be reckoned the best variety in the Saháranpur garden.

4. These accounts are not very favorable. Sítapur seems to be the only place in Oudh where good results have been obtained. However, from what I know of the trees in this garden, I hesitate not to say that, with good soil and treatment, good and satisfactory results may be realized.

The enquiries made will, I hope, lead to more attention being given to the trees which already exist in the different public gardens.

Sylhet.

5. To this variety I give the second place. In point of flavour it is better than the Malta, but it is a light and rather irregular bearer. It is, however, a variety well worth planting, as the trees grow rapidly and, as a rule, are healthy.

Paenbagh Syn. Seville.

6. This variety, first known under the name of Paenbagh (from the garden in which it was found) and now called Seville, I place third. At first sight it looks like the Malta and may easily be mistaken for it, but the fruit is larger and coarser and inferior in flavour. On the whole, the trees seem more vigorous and bear better than the Malta, owing, no doubt, to being better acclimatized, having been much longer in the country. I am told the trees in Paenbagh, from which the garden plants were raised, were large trees about the time the horticultural garden was made, and must have been introduced and planted by some of the Oudh kings.

Nagpur, large and small.

7. The two kinds from Nagpur resemble the Sylhet in appearance, but are wanting in flavour, and are still more irregular in bearing. They bore scarcely any fruit last year, and until they have been longer under observation, their place among the other kinds cannot be determined.

Kewla.

8. This at present I place fourth. It is unrivalled as a cropper, both as to quantity and regularity of bearing; the fruit is, however, wanting in sweetness, and until dead ripe is scarcely eatable.

Mandarin.

9. This, as stated in a previous report, is totally unsuited to the plains, at least where hot winds prevail, as they destroy to an injurious extent the young growth, and cause the fruit to shrivel and fall off when in a young state. It seems a delicate constitutioned variety, likely to succeed only in a climate of moderate and equable temperature.

Cintra.

10. This variety, like the Mandarin, does not seem adapted to our climate; the trees are mostly unhealthy and seldom fruit. What little does come to perfection is good and well-flavoured, but the chance of getting any is far too uncertain to make it worth cultivating.

(a)—IMPROVEMENT OF INDIGENOUS OR ACCLIMATIZED KINDS.

Oranges.

11. First the Malta. The unhealthy vigourless condition of the trees is the chief drawback in this variety; the object in view is to remove this. The methods at present contemplated to effect this are by budding on the Seville and Malta lemon, which are considered likely to prove more suitable as stocks than the common sour lime at present used. Planting in better soil will also be tried. Last year seeds of the Seville orange were sown and a number of plants raised for stocks, they will not, however, be large enough for budding on till next February. Layers of the Malta lemon were put down in the rains for the same purpose and will also be budded with the above.

12. A plot has been selected which will be trenched, manured, &c., during the coming rains, and on which trees of the Malta will be planted when ready about August next.

13. The two trees budded on the pummelow stock and planted out in 1878 are still doing well, but have not fruited yet.

14. The following, also worked on the pummelow stock and planted with the last-named, are still doing well:—

Nagpore, large...	2
Ditto small	2
Sylhet	4
Malta lemon.	2
Kewla	1
Cintra	1
Pummelow	1

Hitherto budding only has been practised; this year I resolved to try the effect of grafting (inarching). A number of stocks of the large sour lime were accordingly put into pots, and the following kinds inarched upon them :—

Malta	10 plants.
Kewla	7 do.
Cintra	5 do.
Sylhet	6 do.
Nagpore	5 do.
Mandarin...	2 do.
Pummelow	7 do.

These will be sufficiently established to plant out next rains, and will form a second set to those on the pummelow stock.

15. Judging from the rapid and vigorous growth made by some layers of the Malta lemon put down last rains, it is considered likely to do much better on its own roots than worked, as at present, on the sour lime. A few of these layers will this year be planted out permanently with the object of practically testing this point.

16. Hybridising is the only method thought of as yet for improving the other kinds of oranges; this was tried last year, but unfortunately no fruit came to perfection from the fertilized flowers. I look upon this method as likely to produce good results, and do not consider one season's failure affords any reason for considering success unattainable. **Hybridising.**

This year a large number of flowers were fertilized, and each kind tried as a possible seed parent. The results are instructive, and show the Mandarin, Sylhet, and Kewla as the best seed bearers, but even with these the results are disappointingly small, only two or three flowers in each case having formed fruit. Of the flowers fertilized on the Malta, Seville, and pummelow, not one set.

17. The object in view is to get a variety with the constitution and prolific nature of the Kewla, the fruit having the flavour of the Sylhet, Mandarin, or Malta. The process is a slow one, as indeed is the improvement of variety and culture in fruit generally.

18. Early in the year an experiment was commenced with the object of trying the cultivation of the Kagzie lime in old mortar and different kinds of soil. As the effect of good drainage was also in view, one of the terraced divisions was selected as a site. The arrangements are :— **Kagzie lime.**

1st.—A line of old mortar, 85 feet long, 8 feet wide at the base, and 6 at the top, and 3 feet deep, was laid down in an excavation one foot deep. No soil or manure was mixed with the mortar.

2nd.—A parallel line or ridge of the same dimension as the above, and 4 feet from it, was made up of two parts natural soil, one of river clay, one old sweepings, and one of old mortar (as used in the first).

3rd.—Four feet from the last, a third line or trench, 10 feet wide was made by digging out the soil to a depth of four feet below the surface. Fused bricks *(kanjar)* were then laid in about 1½ feet deep; and to keep the soil from filling up the spaces between the bricks, a good layer of date palm leaves was laid over them, and over these a good layer of grass finished off with leaves. The trench was then filled up to the surface level with the following compost, three parts natural soil, one part river clay, two parts old sweepings.

This trench is intended to test the effect of drainage at the roots, a condition considered of the greatest importance to the citron tribe.

4th.—Adjoining the foregoing a line was prepared by trenching 2 feet deep and manuring freely with old sweepings, night soil, and river clay. These were well mixed and worked in with the natural soil as it was turned over.

5th. A line next to the above will be planted with the same kinds of trees, but no preparation will be made for them.

19. Thus the effect of drainage and five different kinds of soil will be tried, and it is hoped the results will show the best manner of cultivating not only the lime but oranges as well, as it is intended to plant two trees of each kind on each of the above lines.

Twelve trees of Kagzie lime were procured from Agra and two have been planted on each line ; the same numbers of the ordinary Lucknow kind have also been planted; when ready the oranges will also be put down.

Vines.

20. This year the vines are in worse condition than last, indeed I have never known them to be so bad. I attribute this to the heavy and continuous rain and excessive cloudy weather which prevailed during the monsoon. The leaves and young growth were almost entirely destroyed, and a very considerable portion of the old wood also died off.

When the growing season arrived, they broke weakly and without blossom and are consequently fruitless this year, with the exception of two old plants of black Hamburgh, which are bearing a few small bunches. As the vines are very old, their improvement is, I fear, hopeless, and their replacement by new plants, arranged in better system, is highly desirable.

New vinery.

21. The plants in the new vinery are also fruitless, but the growth was not so much injured as in the old vinery. This may be taken to show the advantage of planting on ridges or in a position where the roots do not get waterlogged during the rains.

22. The kinds in the garden are :—

Bombay red.	Royal Ascot.
Country white (3 varieties).	Mrs. Pince's black Muscat.
Black Hamburgh.	White Frontignan.
Royal Vineyard.	Madresfield Court.
Stillward's sweetwater.	Three black varieties (unnamed).

So far, the best varieties are black Hamburgh, Bombay red, the three unnamed varieties, and country white. The others are too young to fruit yet ; when they do so the above order of merit will no doubt be considerably altered.

From Lahore in 1878.

Bowood Muscat.	Chatsworth.
Black Prince.	Bedana.

These have made little growth yet and do not promise well.

23. The vines presented by Dr. Bonavia last year are only ornamental, not fruiting, varieties.

24. It is intended to try the effect of grafting vines on different stocks, and a number of plants of several varieties have been placed in pots for this purpose.

Peaches.

25. There are four kinds of indigenous peaches in the garden, which, in order of merit, stand thus :—

Agra	Nawabgunge.
Hardoi.	Flat China.

A few full-grown trees of each exist irregularly planted together ; all fruit annually.

The fruit of the Agra is of medium size with a juicy melting flesh, possessing a dash of the true peach flavour. It is a few days later in ripening than Hardoi and Nawabgunge.

Hardoi takes lead in point of size, but the fruit is badly shaped and not very well-flavoured.

Nawabgunge fruit medium sized, smooth skinned, well shaped, altogether taking in appearance, but worthless owing to its astringent bitter flavour. It is not now propagated, and will be eliminated from the garden.

The flat China is a late kind, but the small ill-shaped fruit is of very little value.

26. A few years ago plants were obtained from Sítapur, which is noted for its good peaches. After waiting three or four years for the trees to fruit, they have turned out only worthless seedlings. Efforts will, however, be made to secure plants or buds of the true variety.

27. Good sized trees of two English varieties (Royal George and Noblesse) also exist, but they never bear any fruit, the blossom appears in April, when the air is too hot and dry for its proper development. I do not think they can be successfully acclimatized in the plains.

28. Plants of six indigenous kinds were received from the Superintendent, Government Farm, Allahabad, two years ago, and planted out, but until they fruit, it is impossible to say whether they are superior or not to the kinds already in the garden.

29. I have already stated that the four first-named kinds fruit annually, and (I may add) bear abundant crops; in fact, so freely does the fruit set, that extensive thinning has to be resorted to to save the trees from exhausting themselves and breaking down when the fruit is full grown.

30. With regard to treatment, no irrigation is given after the rains till the bloom has set and the young leaves are appearing, thence regularly up to the rains. The trees are pruned about the end of December, after which a surface dressing of manure is given, which is forked in lightly so as not to break the roots. This has been the usual course for the last five years, with the exception of an effort made three years ago to enrich the soil (which is naturally poor) by digging out a trench round each tree five or six feet from the stem and filling it up with a compost of natural soil, river clay, and cowdung. No marked improvement has been caused by this, but it has no doubt largely helped to maintain the trees in the fruitful condition previously noticed.

31. I have always failed to grasp the advantage of opening out the roots of fruit trees and leaving them for some time exposed, as recommended by those who have felt themselves competent to advise in such matters in this country, and therefore have never attempted to practise this method. I am, however, told that the fruit produced by peach trees so treated is much larger than what is obtained in this garden under the treatment now followed. I therefore resolved to try the root-exposing system, and had a row of trees treated accordingly. I have just examined and compared them with the trees treated in the usual way, but fail to detect any difference between the two. Further trial is necessary and will be made in order to arrive at a settled and satisfactory conclusion as to the best method to follow.

32. Experience has shown December to be the best month in which to transplant peach trees.

33. There is a small plantation of alu bokhara, (*prunus bokhariensis*) which does well in the poor sandy soil of the garden. The trees never fail of a good crop, which they manage to produce without any manure or other artificial stimulants. It is a most useful fruit, of easy culture, and should be in every garden; here the fruit comes in about the middle and lasts till the end of May. Alu Bokhara.

Aloocha.

34 The aloocha (*Prunus domestica*) was tried, but after growing to a large size, the trees yielded very little fruit and were on that account condemned and cut down by Dr. Bonavia.

Mangoes

35. The following kinds of mango are under cultivation in the garden :—

1. Malda.
2. Safeda.
3. Malihabad
4 Amin.
5. Bhadania
6. Surkha.
7. Zarda.
8. Bombay.
9. Beresa.
10. Runtra.
11. Baheri.
12. Pachumba.
13. Bara Malda.
14 Bar Patta.
15. Lungra.

Nos. 1, 8, and 15 are old well-known varieties and require little notice, No. 5 is also, I believe, a kind which has been long in existence, but does not appear to have been much noticed or propagated.

36. Although arrangements were made to allow the fruit to remain on the tree as long as possible, it was not found possible on account of ripeness to leave any after the last week in September. Hitherto it has only been grafted on common seedling stocks. This year stocks from *bhadania* seed will be raised for grafting it upon, with the hope that they may have some effect in causing it to fruit still later.

37. Nos. 2, 3, 4, 6, 9, 12, and 13 are varieties which have been collected from other gardens. As they may not be much known some slight description of each is given.

No. 2, Safeda, fruit small, skin light colored, flesh dark orange color, requires keeping a few days after gathering to produce the proper flavour, which is good.

No. 3, Malihabad, is a large-fruited variety, but of moderate flavour.

No. 4, Amin, also a large-fruited kind, resembles Malda, but has little flavour.

No. 6, Surkha, fruit rather smaller than Bombay, comes in later, flavour good.

No. 9, Beresa, round medium sized fruit, late, can be kept till August, stands intermediate between the other kinds and Bhadania, fruit well-flavoured.

No. 12, Pachumba, size and flavour of Malda, but better shaped.

No. 13, Bara Malda, a large variety of Malda.

Nos. 7, 10, 11 and 14 are seedlings selected and named by Dr. Bonavia. Runtra, No. 10, is, however, the only one worthy of notice, the fruit is about the size of Bombay, thick skinned and well-flavoured. The other three, *viz.*, Zurda No. 7, Baheri No. 11, Bar Patta No. 14, are little, if at all, superior to common seedlings, and not worth propagating.

38. The selection and raising of seedlings is likely to be more productive of new and improved varieties than any method of cultivation or treatment at present known to me. Nothing but harm would, I think, be caused by root pruning, as the mango is very susceptible of, and generally resents interference with its roots. Neither can I perceive that any good would be done by pruning the branches. Pruning evergreen trees, with thick resinous sap, is generally found injurious, and either the branch pruned dies back to the main stem, or a number of latent buds are forced into growth below the cut, the latter resulting in a divided weakened and (in the case of fruit trees) unfruitful growth ; if the former, the tree is weakened by the loss of branches.

Arabian date palms.

39. A number of trees fruited last year, but only on one did the fruit come to anything like perfection. Very little reached a ripe state, owing to the depredations of rats and squirrels, and the damp prevalent during the rains, August, when the fruit was ripening ; the trees which bore the preceding year did not fruit at all this.

This year 17 trees are in fruit, which is looking well as yet. When in flower all the female spikes were fertilized which appears to have had excellent effect, as never before did the fruit set so abundantly, or look so large and fleshy; some of the spikes seem overloaded, and threaten to break down under the weight of fruit on them.

40. At the time the trees in the garden were planted, plants were sent to the following places:—

Unao; Bara Banki, Fyzabad, Gonda, Bahraich, Sitapur, Hardoi, Kheri, Sultánpur, Rae Bareli, Partabgarh.

The following reports regarding the progress and condition of the trees up to the end of March, 1880, have been received:—

Station.	No. alive at the end of Mar., 1880.	Average height.	No. which fruited in 1879.	Remarks.
Unao Jail Garden ...	42	5½ to 7 ft.	1	The tree that fruited last year, notwithstanding much care, the fruit did not ripen, much was eaten by ants This year another tree is fruiting. These two trees that have fruited are about 12 feet high the others lower. The trees of the Jail seem to have been better cared for than those elsewhere. At the Jail they have been well watered.
Government Garden ...	140			
Dispensary ...	19			
Native Gardens ...	34	3 to 5 ft.		
Bara Banki ...	15	6 ft 8 in.	...	The trees are getting on well.
Fyzabad ...	...	...	...	Report not received.
Gonda ...	48	4 to 7 ft.	...	
Bahraich ...	167	6 to 14 ft.	12	
Sitapur ...	446	1 to 16 ft.	5	
Hardoi ...	58	4 to 25 ft.	...	3 died in the year.
Kheri ...	235	5 feet.	...	Trees are thriving.
Sultánpur ...	320	3 to 10 ft.	...	The trees are looking very healthy and handsome, but the blossoms borne this year have been destroyed by the strong east wind.
Rae Bareli ...	361	2 feet.	...	The trees do not seem to thrive here. Since 1877 151 have died, and although 15 trees produced flowers, they merely withered away without fruiting
Partabgarh ...	199	6 feet	Not counted, about 16 or 20.	

The number of trees thus shown to be alive in the above is 2,081, in the Horticultural Garden 414 are alive, and in various places in Lucknow 164, making a total of 2,659. The biggest tree in the Horticultural Garden is about 22 feet. On the whole, the trees appear to be making good progress, especially where some care and attention have been bestowed. In four stations a few trees have fruited, it is not, however, stated whether any of it matured properly. The blossoms reported to have withered were probably males. Information regarding the necessity and method of fertilizing the flowers will this year be communicated.

41. A number of seedlings have been raised from the seed produced by the trees in the garden, but they are too small to send out yet. I regret to state that a number of offsets which appeared to have rooted, died off during the rains through excessive moisture.

Bers (Zizyphus Jujuba.)

42. Progress with *bers* is, I regret to state, very slow. To gain time a number of stocks were purchased, but as a number of them died, little was gained. Then, when stocks were ready, the buds inserted did not take well. So far only nine budded plants are ready; they are all one kind, known by the name of "najuk badan," and much esteemed by natives. Seedlings of five other kinds are ready and will be used as stocks. A number of buds of the best kinds will be worked on each with the object of finding out which kind affords the most suitable stock.

43. The two best kinds are "najuk badan" and "Pawandi." When plants of both are ready, the following experiments will be tried :—

2 trees planted in ordinary soil left to nature.
2 ditto ditto ditto root pruned.
2 ditto ditto in manured soil to be root pruned.
2 ditto ditto ditto left to nature.
2 ditto ditto ditto and top pruned.
2 ditto ditto on a concrete surface.
2 ditto ditto on a raised surface.

Two plants of each of the abovenamed kinds worked on the abovenamed stocks will also be planted out.

44. Selection and hybridizing will also be tried when trees under control are large enough to bear.

Carob, Inga dulcis, Mesquit bean.

45. Carob, Inga dulcis, and Mesquit bean (*Prosopis glandulosa*) have been placed among arboricultural trees and are mentioned under that head.

Strawberries.

46. Experiments with strawberries, similar to those of last year, have been carried out again this year. Plants could not be had at Dinapore, all having been destroyed by the inundation which occurred there in the rains ; a supply was therefore obtained from Hardoi instead. Lucknow plants were also tried. An equal number of plants from each place were planted on trenched and untrenched ground, the plots were contiguous. The trenching was carried out as proposed last year, the surface soil being kept above, the subsoil being loosened and manured and left in its original place.

47. The greatest yield was from Lucknow, plants on untrenched ground on ridges. On trenched ground, Lucknow plants gave the greatest yield on beds.

Hill plants gave slightly the best yield on beds, on untrenched ground, but the advantage over the other plots was very small.

Meerut plants gave the best yield an trenched ground, both on ridges and beds, while Hardoi plants gave the best yield on untrenched.

The total yield of each from the four plots was Lucknow 10 seers, Meerut 8 seers 10¼ chts., Hill 8 srs. 9½ chts., and Hardoi 5 srs. 15¾ chts.

Comparing the total yield of the four kinds from trenched and untrenched ground, untrenched on beds gives the greatest yield. The four plots stand thus :—

	Srs.	*chts.*
Untrenched beds	9	¾
Trenched do.	8	14
Untrenched ridges	8	14¼
Trenched do.	7	6¼

48. These figures confirm last year's in favour of a level surface against ridges. The plots were all of the same size and treated exactly alike ; all were mulched with tan.

All commenced bearing about the same date ; previously hill plants were found the earliest, and this would probably have been the case this year but for the poor weakly plants sent down by the Naini Tal growers. It is much to be regretted that they do not bestow more attention to the production of strong healthy plants ; were such forthcoing, I have little doubt a large demand for them would spring up.

49. An experiment was made by leaving a number of plants undisturbed where they grew last year ; they formed a thick mass and looked healthy and vigorous enough, but yielded very little fruit.

50. A number of surplus plants were also tried on a plot which received a good dressing of river clay some three years ago. The plants were rather late in being put

in, so that the trial was not quite a fair one; the experiment was almost a complete failure, very little fruit being produced.

51. *Table showing the expenditure and receipts per acre attending the cultivation of several orchard fruits :—* Cultivation of fruit trees. Profit and loss.

	Cost per acre.	Value realized per acre	Profit per acre.	Loss per acre.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Peaches	49 1 9	163 11 6	114 9 9	...
Vines	66 5 6	57 1 3	...	9 4 3
Alubokharas	17 3 0	56 14 3	39 11 3	...
Pummelows	16 2 3	89 11 0	73 8 9	...
Malta lemons	37 3 0	37 8 6	0 5 6	...
Mangoes and pineapples	31 12 0	200 0 0	168 4 0	...
Leechees	28 0 0	8 0 0	...	20 0 0
Malta oranges	32 10 3	30 3 0	...	2 7 3
Cintra ditto	28 1 9	84 5 3	56 3 6	...
Mandarin ditto	42 12 0	...	...	42 12 0

(*b*) INTRODUCTION OF NEW KINDS.

52. During the year the undermentioned fruit trees were received from the Agri-Horticultural Society of India, six kinds of mangoes, *viz* :— Mangoes.

Vizianagram.
Khabapureeah.
Society's No. 1.
Stalkart's No. 1.
Bhandoorea.
Alphonse.

Also seven kinds of leechees, two kinds of lime, avacado pear (persea gratissima), Brazil cherry, Eugènia Michellii. Later in the year buds of ten kinds of peach were received, but they do not promise well as yet.

53. Two plants of Moreton Bay chestnut (Castanospermum Australe) were presented to the Garden by Captain Home, who brought them out with him from Australia. One plant has been planted in the Horticultural Garden, the other in the Wingfield Park. As yet both are doing well and appear healthy. Chestnut.

54. Five new kinds of pineapples were also presented by Major Wheeler, Cantonment Magistrate, Cawnpore. I had often wished to get some of the good kinds grown in England, hence these were highly acceptable. The common pineapple does well in the Garden, and I have no doubt the good kinds grown in Europe would do well also. There is some doubt about the identity of these, as unfortunately before reaching here their labels got detached, and, it is thought, were not placed on the right plants again. Pineapples.

55. About four years ago plants of a species of Anona were raised and planted out. This year one or two of the largest trees fruited, but it dropped before coming to any size, evidently prematurely; hence a correct opinion as to whether it is worth cultivating cannot yet be formed. Unfortunately no label was attached, and the correct name is not known. I take it to be *Anona reticulate*, commonly called "bullock's heart" or sweet sop. Anona.

56. Some years back a good stock of plants of Garcinia Roxburghii were raised from seed. They have always been kept in pots and shelter, as it was thought they would not stand the cold in winter if planted out when small. This year several of the plants have fruited. The fruit yielded was small and not of much note as regards flavour. It is, however, desirable to give the trees a better trial by planting them out, which will be done next rains. Garcinia Roxburghii mangostana.

57. Last year two plants of the rose apple (Eugènia jambosa) were received from Saharánpur and planted out.

58. So far as I am aware, sapota (achras sapota) has not been tried in the Horticultural Garden. There is a small tree of it in the Wingfield Park, which flowers but does not produce fruit.

59. A stock of trees has been raised of a large white guava from seed received from Mr. Creswell of Melbourne.

60. Of the fruit trees received from Saharánpur and Lahore last year, the following only are alive :—

Pear, Marie Louise 1.
Do. Jargonelle 3.
Do. Flemish beauty 1.
Apple, Cashmere 1.
Do. Cabul 2.
Do. Hawthornden 2.
Quince 1.
Plum, magnum bonum 1.
Apricot, Brussels 1.
Nectarine, Claremont 1.
Do., Roman 1.

Not deeming one trial sufficient, I have had the dead plants replaced as far as possible with fresh ones from Saharánpur.

(c) DISTRIBUTION.

61. The following fruit trees have been sent out during the year :—

Name.	Sold.	Sold at ½ price to public gardens.	Distributed *gratis*.	Total.
Oranges	115	50	76	241
Mangoes	234	146	...	380
Malta lemons	27	200	4	231
Kagzie limes	24	...	4	28
Sweet lemons	3	...	...	3
Sour ditto	1	300	...	301
Loquots	46	...	9	55
Vines	208	...	...	208
Leechees	23	23	6	52
Peaches	22	...	6	28
Pineapples	12	...	...	12
Plantains	24	...	2	26
Papetas	6	...	...	6
Pomegranates	4	...	...	4
Pummelows	2	...	...	2
Alubokhara	3	...	...	3
Jack fruit	50	...	...	50
Total ...	804	719	107	1,630

Rs. 381-9-0 were realized by sale of fruit trees during the year.

62. To meet the great demand for fruit trees, especially mangoes and oranges, large stocks are being raised, and it is expected next year's distribution of fruit trees will be considerably greater than this.

II. VEGETABLE AND FARM CULTURE.

Early sowings of English vegetables

63. The trials begun last year of sowing imported vegetable seeds in the rains were continued this. The results were slightly better than those of last year, but still far from sufficiently successful to justify the practice being recommended for general adoption. Six kinds were tried, as follows :—

Sutton's king of the cauliflower.
Brussels sprouts.
White knol-khol.
Sutton's imperial cabbage.
Tom Thumb cabbage.
Sugarloaf cabbage (Saharánpur seed).

Four sowings of each were made on the following dates :—July 2nd, August 11th, August 28th, September 4th, an equal quantity of seed of each being sown in pots in shelter and open beds on each occasion.

The seed sown in the pots germinated quicker and better than in the open beds. None of the kinds germinated well, knol-khol best. The cauliflower and Brussels sprouts failed, not a single plant came to perfection from any of the sowings.

Knol-khol was most successful. Plants from the first sowing were ready first week in November; from the second sowing August 3rd ; plants came in 11th November. The two later sowings did not germinate.

From the first sowing of imperial cabbage a few plants survived, but they were later than those raised from the general sowing (16th September), and poor inferior specimens. The two last sowings did not germinate.

A few plants from the first sowing of Tom Thumb cabbage came in, 12th November, before plants from general sowing were ready. The later sowings failed.

The few plants of sugarloaf from the first sowing which survived came in about the end of December, were behind kinds from general sowing, and consequently no advantage was gained by sowing early.

It appears to be a late kind and not adapted for early work. The later sowings of this, like the others, failed.

64. As the seed used for all the sowings was the same, some explanation as to the failure of later sowings is called for. This was doubtless caused by the exposure to a damp atmosphere involved in opening the seed packets for sowing in the rains. One exposure was not fatal, but after the second the seeds lost vitality as shown in the complete failure of the two last sowings. This teaches the necessity of providing separate packets of seeds when early sowing is contemplated, otherwise the ambitious grower may find himself without vegetables for a season.

65. Some of the garden acclimatized cauliflower seed was sown in June ; it came up well, and a stock of plants was reared and planted out in July. The plants seemed to have a hard struggle for existence, but finally (about the end of November) developed moderate sized heads. They were not so early as anticipated ; earlier sowing will be tried this year.

Acclimatized silverskin onion.

66. An early sowing of this was tried, with successful results ; the seed was sown on the 22nd July in an open bed, it came up well, and the plants maintained a healthy growth throughout. They were ready for use by the beginning of November.

67. A sowing of seed, received from Saháranpur the previous cold season, was made at the same time. It did not germinate well, but the few plants which grew came on well and were ready as soon as the above.

Peas.

68. An early sowing of peas was also made ; the kinds selected were Sutton's ringleader and Laxton's Alpha, both early kinds. The first sowing of ringleader was made on the 29th September, germinated moderately ; plants were poor and gave a very light yield. Later sowings of the same produced excellent crops, proving that the seed was not at fault. Laxton's Alpha was sown on the 16th September, germinated fairly well, but plants were poor and came to nothing. Later sowings of the same did well.

Trial with Saháranpur vegetable seed.

69. From the Saháranpur and Chajuri gardens no less than 55 kinds and varieties of vegetable seeds were sent, far too great a number to receive proper attention in one season ; and if these trials are to be continued, I would take this opportunity

of asking that only the varieties of one kind may be sent. This year no less than 11 varieties of lettuce were sent, which alone were enough to have had under trial in one season.

(*a*)—IMPROVEMENT OF INDIGENOUS OR ACCLIMATIZED KINDS.

Potatoes.

70. As directed in your No. $\frac{223A.}{N.}$, dated 4th July, 1879, an experiment with potatoes was undertaken with the object of finding out whether Lucknow, Jaunpur, or hill seed gave the best outturn.

71. The ground was selected and ploughed with the English plough in July. It was then measured off into six plots, each measuring $\frac{1}{30}$th of an acre. Three were then manured with night soil, the other three were left unmanured.

72. The three kinds could not be planted at the same time, as hill seed is not available when plain seed is usually planted ; the planting of these, therefore, at different dates does not, as might be readily supposed, vitiate the results.

73. Lucknow seed, planted 21st of October and lifted on the 12th March, yielded—

Manured.	*Unmanured.*
9 mds. 28½ seers.	6 mds. 9¾ seers.

Jaunpur seed, planted 4th November, lifted 7th April, yielded—

Manured.	*Unmanured.*
5 mds. 14 seers.	4 mds. 33 seers.

Hill seed, planted 5th November, lifted 3rd May—

Manured.	*Unmanured.*
2 mds. 20 seers.	1 md. 15 seers.

By far the heaviest yield is from Lucknow seed, but the tubers were nearly all below medium size and a large proportion were small. Those from Jaunpur seed were similar in size, but with few small ones. The produce from the hill-seed was much the best in size and appearance, also in quality and flavour.

74. The respective prices at which they were sold were 80, 75, and 60 seers per rupee. Though sold at the lowest rate, Lucknow seed on account of the much greater yield, is shown to be the most profitable of the three.

Maize.

75. Owing to want of space, agricultural experiments, except on the smallest scale, have been given up. Bulandshahr maize and other agricultural seeds were therefore transferred in September last to the Cawnpore farm.

Experiment with maize in the cold weather

76. The three kinds of maize seed sent with your No. $\frac{2111A.}{CCCZXXXV.}$, dated 24th September, 1879, were sown on the 29th of September. All germinated well, and, throughout, the plants were strong and healthy ; I have never seen a more flourishing crop from imported seed. The yield of cobs was good ; they were numerous, large, and well filled. My previous experience with imported maize, sown at the usual time, has been that the cobs were only half filled.

The crop ripened and was gathered on the 15th March ; the yield of cobs from each was golden dent, 8 seers ; white flint, 6¼ seers ; early yellow canaday, 6⅛ seers.

77. This experiment conclusively proves the feasibility of growing maize in the cold season under irrigation for an early food-supply in times of scarcity.

78. As food, the cobs were ready early in January. The existence of *bhcotas* at that season caused much surprise to native agriculturists who visited the garden and saw them · the fact was noted as something decidedly new.

79. This was grown chiefly for seed. No attempt was made to cultivate it. A number of seedlings came up on the plot where the preceding year's crop was grown; part were thinned out, and the rest allowed to grow up for seed. Although no manure was given, the crop was a splendid one, and gave a good yield of seed. This shows it not to be so exhausting a crop as was at first supposed. **Reana luxurians.**

80. In 1877 a packet of grass seed *(sporobolus elongatus)* was received from the Queensland Acclimatization Society. Being small in quantity, it was necessary to raise a stock of seed before it could be tried on a sufficiently large scale. A sufficient stock of seed was available last year, and a plot, measuring 345 square yards, was sown down with it in August. A similar area was put down with *dúb* grass, with the object of ascertaining which would give the greatest outturn. **Queensland and dúb grass.**

The respective yields, so far, are—

Dúb 14 mds. 14 seers. Queensland 6 mds. 28 seers.

It is possible the Queensland grass may improve as it gets more established. The experiment will therefore be continued another year.

81. I much regret having to report the complete failure of the acclimatized Belgian carrot seed. It was sown with fresh imported seed, which germinated well, but not a seed of the other came up. The seed was unquestionably bad; the cause of its being so I can only attribute to its having received a fall of rain when ripening. It was, however, thoroughly dried before being stored, and no unsoundness was observed either then or when taken out for sowing and distribution. Seed was sent to Saháranpur, Cawnpore, and Awa; it failed at the first and last, and appears not to have been sown at Cawnpore. Seed is being grown again this year, and I hope better success will be realized. **Belgian carrot.**

82. The Javan tobacco seed sent with your No. $\frac{413\ A.}{CCZXXXIIA}$ of 12th March, 1879, failed to germinate. It was sown at the same time as four other kinds, all of which came up well. **Javan tobacco.**

83. In 1878 the cultivation of country vegetables was commenced, the chief point in view being their improvement by careful selection of seed and as well to secure a stock of true seed to meet orders. **Country vegetables.**

84. So far, the majority of the kinds show no improvement, but in two kinds, *viz.*, *chachenda* (trichosanthes anguina) and *bhindi* (hibiscus esculentus), considerable improvement was apparent; the produce of both was larger and better shaped than before. *Chachenda* is a wholesome and useful vegetable, coming in as it does in August or September.

85. The kinds of country vegetables grown were—

In the hot weather.

Lauki, kakri, khira, kaddu, tarbuz, karela.

In the rains.

Sem, kakri or phút, lauki, lobia, turei ghia, turei aru, chachenda white and black, khira, karela. **Acclimatized vegetables.**

86. The kinds which have been most successfully acclimatized are—

Cauliflower, early and late.
Lettuce cos
Tomato, large red.
Ditto, greengage.
Ditto, ovalshaped.
Salsify.
Spinach.

Cauliflower.

87. Acclimatized cauliflower seed is preferred to imported, on account of its earliness. The early kind is at Lucknow commonly sown in June, and the crop gathered early in November. This cannot be done with imported seed ; I have never managed to get cauliflowers from the latter till late in December. The produce of acclimatized seed is generally inferior to the imported, but if cut before the heads get large they are by no means to be despised. To have succeeded in raising a variety at least a month earlier than imported kinds is a valuable result.

Late cauliflower.

88. The late variety succeeds the early and prolongs the supply over a longer period than could be done with the early kind alone ; the produce is also superior. Another important merit in acclimatized seed is that it germinates better and quicker than imported seed does.

Lettuce.

89. The lettuce is an excellent variety, producing large heads, which heart well. The opinion of Mr. Gollan of the Saháranpur garden, *vide* distribution list, fully bears out this statement.

Onio.

90. The silverskin onion is also an excellent variety. Its merits are that it germinates better and more surely than imported seed is found to do.

Tomato.

91. Superiority in the produce is not claimed for the tomatoes, but earliness and a more flourishing, more certain, and better crop are merits on their side.

Salsify.

92. I can scarcely say salsify is a success. The plants soon run to flower, and consequently produce inferior roots.

Spinach.

93. The spinach is a small variety, but it comes in early in October when vegetables are scarce, and is valuable on that account.

(*b*)—INTRODUCTION OF NEW KINDS.

Imported vegetables.

94. Of imported vegetables only one new kind was tried, *viz.*, *couve tronchuda*, or Portugal cabbage. The plants flourished, but produced chiefly leaves ; the heads, which did appear were small and coarse looking. I consider its merits as a vegetable are very small.

95. Two new kinds of tomato from Sutton and Son were introduced, *viz.*, Hathaway's excelsior and Greengage. The first-named is a medium sized red kind of good shape, and almost free from wrinkles ; the other is a small yellow variety, fruit smooth and even, of a mild pleasant flavour. Seed of both has been saved, and it is hoped they may be successfully acclimatized.

Country vegetables.

96. Two new kinds of country vegetables were introduced, *viz.*, *makkan sem* and *runga sem*. The first is an extensive climber, and is at home with a tree to grow upon ; the pods, which are large, are used when young, in which state they are an excellent vegetable. It grows during the rains and early part of the cold season.

97. The other is a smaller kind in every respect, and though not quite so good, is well worth cultivating. It grows at the same season.

(*c*)—DISTRIBUTION.

98. For the purpose of making the acclimatized seeds more known, and also to obtain the opinion of others regarding their merits, a quantity was supplied to the following places.

To the Superintendent, Botanical Garden, Sahárenpur :—

Cauliflower, early and late.
Onion, silverskin.
Lettuce cos.

The remarks received from the Superintendent are—" Two sowings were made ; germinated freely in both cases. The two varieties, early and late, came in together. A large proportion of both varieties ran to seed. Our own acclimatized seeds, which gave good results from early sowings, were not in any way superior to yours, sown on the same dates and treated alike. Cauliflower.

" I must say that your silverskin onion is a superior variety to the one I have. The produce of both per acre was much about the same, but there were not so many deformed and thick-necked bulbs among silverskin as among the red skinned variety I have. It is also a better flavoured onion when cooked. Onion.

" A splendid variety ; three sowings were made, and all made heads superior to any imported varieties we had. Enquiries were made by parties who received it in dallies where the seeds were obtained from." Lettuce.

To the Agri -Horticultural Society's Garden, Panjab.

99. The reply received is—" Cauliflower and lettuce seed supplied for trial germinated freely, but the vegetables produced were inferior in size and quality. Most of the lettuce plants raised quickly, ran to seed, very few formed heads fit for table use, the cauliflower plants produced small heads, but of good color. Cauliflower and lettuce.

100. To the tahsildar of Meerut :—

4 ozs. onion, silverskin.
4 ozs. cauliflower, late.
2 ozs. lettuce.

I regret to state that no report has been received from him, although repeatedly asked to be so good as to furnish one.

101. Mr. Cauty, of Khawaspur factory, having expressed very decided opinions as to the worthlessness of acclimatized cauliflower seeds, led me to offer him a supply, with the request that he would give it a trial. This he agreed to, and a packet of our late cauliflower seed was sent. The substance of his reply is—" Owing to the inundation of the Ganges, the ground could not be got into order for planting till late in October. Though the soil was manured, it was too late, and was not what cauliflowers seek or require. The cauliflower from English seed came absolutely to nothing. The cauliflowers from the seed you sent me were the only ones I had this year; though they were small, measuring 4 to 6 and some few even 8 inches in diameter, yet they were good. I can only attribute this success to acclimatization."

102. Two ounces each of the late variety of cauliflower was given to three market gardeners in Lucknow. Two report that the seed germinated well, but that the plants were lost for want of attention, owing to their being laid up with fever when the plants were in a young state. The third reports his plants were destroyed by inundation from the river.

Judging from the unanimity and manner in which these three men made their reports, my opinion is that they had no faith in the seed and did not take the trouble to give it a fair trial. As a rule, each grower in Lucknow raises his own seed, and does not care to depend on any but his own. There is not likely to be any demand here for the Horticultural Garden seed, and distribution in the immediate neighbourhood for that purpose is useless.

103. The unfavorable report from Lahore about the lettuce is so widely different from that from Saháranpur that it is difficult to believe they were the same kind. I have, however, no grounds for doubting this, and can only conclude that there must be something very peculiar either in the climate or soil, or both, of Lahore, to bring about such an abnormal result.

The cauliflowers are reported to have run to seed a good deal at Saháranpur. It is not stated whether they formed heads first, if so, they fulfilled their part. Any cauliflower, imported or otherwise, will run to seed if left uncut too long.

104. The amount realized by sale of acclimatized vegetable seeds during the year was Rs. 242-0-0, and Rs. 1,472-0-0 were realized by sale of imported vegetable seeds.

III.—FLOWER CULTURE.

(a)—Improvement of indeginous or acclimatized kinds.

Hippeastrums.

105. Some few years ago Dr. Bonavia cross-fertilized some red and white Hippeastrums (a showy genus of *amary uidaceo*), of which a number were then in the garden. Seed was duly produced and sown, resulting in a large stock of seedlings. These were carefully reared and duly planted out ; last year a few flowered and one or two showed considerable improvement on the original seed-parents. This year several hundreds bloomed, affording, by the great diversity of color and form displayed, ample proof that the effort to hybridize them had been successful A considerable number were strikingly distinct in color to the seed parents, while a few showed improvement in size and form of flower. Many were beautifully striped with white and red, others appeared in various shades of rose, pink, and yellow. No pure white was seen, but a few seemed to have taken on a deeper shade of red than the original kind of that color.

Some of these hybrids are so good that I think they would be prized in England, and when duplicate bulbs are available they might be sent to Kew.

Fertilization is still carried on ; and now that a greater variety of kinds are available to work with, still better results may be attained.

In addition to the good results realized, this experiment has been the means of educating at least the head mallee in one of the higher arts of gardening.

Flower annuals.

106. The number of exotic flowering annuals which have been successfully acclimatized is considerable, and forms rather a long list.

The kinds named below have been grown for several years, and though the flowers of some few are not quite so large and fine as those produced by imported seeds, still they are sufficiently good for flower garden decoration, and when given good treament as to space and soil make capital displays of far from inferior flowers.

The following have been successfully acclimatized :—

Antirrhinum, dwarf and tall (snap-dragon).
Aster China.
Agrostemma.
Brachycome (Swan River daisy).
Calandrina.
Clarkia.

Daisy.
Eschscholtzia.
Gaura grandiflora.
Linum grandiflorum.
Lupin, three distinct colors.
Larkspur, ditto ditto.
Leptosiphon, two distinct colors.
Mesembryanthemum, three distinct colors.

Collinsia.
Chrysanthemum tricolor.
Centaurea (sweet Sultan), three distinct colors.
Clintonia pulchella.
Candytuft, tall and dwarf.
Dianthus sinensis (Indian pink) of three varieties.
Nemophila.
Phlox Drummondii, six distinct colors.
Petunia, three varieties.
Poppy, three distinct colors.
Sweet William.
Sweet pea, two colors.
Viola tricolor (pansy), three distinct colors.
Amaranthus.

Marigold French, dwarf.
Mimulus.
Mignonette.
Nasturtium, climbing, three distinct colors.
Nasturtium, dwarf, ditto ditto.
Balsams, six distinct colors.
Zinnias, five ditto ditto.
Convolvulus major, three varieties.
Clitoria ternatea, white and blue.
Pomœa bona nux, three colors.
Quamoclit, white and red.

The above had a wide distribution this year, and were sold to persons in nearly all parts of India. The chief purchaser was the Agri-Horticultural Society of India, to whom an aggregate weight of 69½lbs. were supplied.

107. An unfavorable report on the germination of these seeds sown in the Society's Garden having been made by the head gardener of the Society, and printed and published in their proceedings, some correspondence on the subject ensued. As the same kinds sown in the Horticultural Garden had germinated well, the report in question could not be passed over unnoticed. To gain satisfaction in the matter, the Secretary of the Society made enquiry of some of the members who had been supplied with Lucknow seeds as to how they had germinated, and, I am glad to say, received most satisfactory replies. I also made enquiry of a number of persons who purchased the seeds and were supplied direct from the Horticultural Garden. Most favorable replies were received from all.

108. The sale of these seeds during the year amounted to Rs. 932.

(*b*) INTRODUCTION OF NEW KINDS.

109. Of exotic annuals, the following were introduced :—

Amblyolepis setigera.
Ageratum, dwarf blue.
Campanula Attica.
Cockscomb, large, red.
Clitorea, double flowered (creeper)
Ditto, pale blue, ditto.
Convolvulus, four colors, (creeper).
Gomphrena globosa.
Godetia tenella.
Ipomœa, three colors (creeper).
Lasthenia Californica.

110. During the year the following shrubs and plants have been added to the garden collection, some were presented, others purchased and raised from seed :—

Dracœna Densonii.
Ditto Chelsonii.
Ditto Guilfoyleii.
Ehretia buxifolia.
Dracœna Shepherdii.
Croton spiralis.
Ixora regina.
Ardisia crenulata.
Tabernamontana crispa.
Dracœna cannœfolia.
Biota compacta.
Ditto aurea.
Mussœnda macrophylla.
Manettia cordifolia.
Bignonia incarnata.
Smilax longifolia variegata.
Ampelopsis variegata.
Asparagus sarmentosus.
Dolichos sp.
Passiflora Banksii.
Abutilon marmoratum.
Croton latifolium.
Ditto rotundifolia.
Ditto multicolor.
Ditto Younghii.
Eranthemum cinnabarinum.
Ditto elegans.
Cordyline stricta.
Rhyncospermum variegata.
Dioscorea illustris.
Albizzia amand.
Brachychiton populneum.
Pithecolobium saman.
Bambusa stricta.
Grewia polygania *setachiny*.
Doryanthes excelsa.
Morvea sp.
4 species of amaryllis.
4 cyclamens.
16 varieties of achimenes.

111. Hyacinths were also grown for the first time ; three bulbs only were procured, of which two did sufficiently well to encourage the hope that this favorite bulb can be successfully grown in the plains.

112. A new shrub named Baccharis halmæfolia flowered for the first time this year. A large stock of it was raised from seeds received from Hong Kong some three years ago. At first it appeared a rather weedy looking plant, scarcely worth giving a place to in a garden. In flower it proves a pleasing shrub, and the flowers specially suited for bouquets.

(c)—DISTRIBUTION.

113. The number of ornamental trees and plants sold and sent out during the year was—

	Sold.	Distributed *gratis*.	Total.
Ornamental trees and plants of sorts	3,881	1,904	5,785
Rose plants	1,224	65	1,289
Cuttings of sorts	536	511	1,047

Compared with last year's these figures show a slight falling off in the number of ornamental plants sent out, but an advance in the number of both roses and cuttings. The number of fruit trees sent out was more than double that of last year.

The approximate value of the plants distributed *gratis* is Rs. 476, and that of the fruit trees sold at half price and distributed *gratis* Rs. 149, making a total of Rs. 625.

I consider it only fair to the garden to show this, so that it may have credit for the full value of its produce.

IV.—ARBORICULTURE.

114. I will first speak of what belongs to the Horticultural Garden under this head.

The arboricultural nursery being a separate institution, it seems to me desirable to keep it so in this report.

Carobs.

115. This year the carob trees bore a very light crop, only 3½ seers of seed were obtained. The pods were much softer and sweeter than in previous years, owing doubtless to the mildness of the season and absence of hot winds when ripening.

Repeated attempts were made to raise plants by budding on seedling stocks ; buds were inserted in different months, but I regret to say all failed. But for a limited number of stocks budding would have been tried all the year round. Grafting by inarching was also tried, but, like the budding, was unsuccessful. When a supply is ready fresh attempts will be made.

Eucalypti.

116. These call for no special notice. The plantations mentioned in previous reports continue to flourish. One tree of *E. citriodora* flowered, and a few seed capsules have formed ; it remains to be seen if mature seed will be developed.

117. As the name of *E. saligna* was not known when first noticed, specimens of it were submitted to Baron Müller and Sir Joseph Hooker for identification. Both pronounced it to be *E. resinifera*. In a letter received from Baron Müller last July, he writes " While working on my Eucalyptus atlas I find this species approaching rather to *E. robusta*, but there are characteristics to separate it from either, and I have temporarily named it *E. Kitorniana* in honor of its discoverer who found it at Illowarra, the *only locality in which it is known* in a wild state." Considering that it has already been distributed under two names, it seems undesirable to add a third, especially as it is only a temporary one; confusion is likely to result by so doing, which will be avoided by adhering to the present name.

(*b*)—INTRODUCTION OF NEW KINDS.

118. The following kinds have been added during the year :— Eucalypti.

Eucalyptus capitellata.
Ditto maculata.
Ditto serberi.
Ditto botryoides.

(*c*)—DISTRIBUTION.

119. Ten plants of *Pithecolobium saman* were sent to the Collector of Shájahánpur. Pithecolobium saman.

120. Carob seed was distributed as follows :— Carob distributed for arboricultural purpose.

To the Collector of Dharwar	2 seers.
Ditto of Satara	3 ,,
To the Deputy Commissioner, Unao	2 ,,
To Mr. Nicholson, Kantit estate	4 ,,

121. Seed of Inga dulcis was sent out as follows :— Inga dulcis ditto.

To the Collector of Budaun	5 ,,
Ditto ditto Bánda	6½ ,,
Ditto ditto Etah	8 ,,
Ditto ditto Farukhabad	15 ,,
Ditto ditto Muzaffarnaggar	3 ,,
To the Collector of Moradabad	½ ,,
Ditto ditto Meerut	1 ,,
Ditto ditto Bareilly	1 ,,
Ditto ditto Gházipur	1 ,,
Ditto ditto Basti	5 cht.
Ditto ditto Kumaun	1 seer.
Ditto ditto Jaunpur	2 ,,
Ditto ditto Etáwah	2 ,,
Ditto ditto Bijnor	15 ,,
To the Deputy Commissioner, Lalitpur	1 ,,
Ditto ditto Sítapur	1 ,,
Ditto ditto Bara Banki	2 ,,
Ditto ditto Gonda	1½ ,,
Ditto ditto Hardoi	2 ,,
Ditto ditto Sultánpur	2 ,,
Ditto ditto Jalaun	10 ,,
To the Director, Department, Agriculture and Commerce, Cawnpore	1 lb
Ditto Superintendent, Government Farm, Cawnpore	10 seers.
Ditto ditto ditto, Allahabad	1 ,,
To the District Engineer, Lucknow	2 ,,
Ditto ditto, Kumaun	1 ,,
To the Superintendent, Dehra Dún	8 ,,
Ditto ditto Tarái, Kashipur	½ ,,
To the Cantonment Magistrate, Ranikhet	2 ,,
To the Manager, Awa estate	6 ,,
To the Cantonment Magistrate, Roorkee	½ ,,
To J. Fraser, Esq., Naini Tal	½ ,,
To T. R. Wyer, Esq., Azamgarh	½ lb

To several purchasers 8 seers were sold.

122. The Inga can scarcely be too extensively planted, and it is hoped that this beginning at distribution may be continued. The current year's crop was the best I had ever seen, and a good supply of seed has been secured. When full-grown it is by no means a small tree, certainly quite large enough for minor district roads.

123. The plantation of *Prosopis glandulosa* continues to flourish, but the plants give no promise of ever attaining arboreal dimensions. Most of the plants yielded a few pods, the seed of which was sown in the arboricultural nursery to complete the plantation formed there ; the seed proved good and germinated. Prosopis glandulosa.

Central Arboricultural Nursery.

124. Sufficient space not being available in the Horticultural Garden for the arboricultural nursery, it was necessary to take up land elsewhere. To find a suitable site within easy distance proved rather a difficult matter. The land known as Raja-ke-Bagh was found to come nearest to the requirements of the case, being convenient, fairly good soil, and irrigable by a low lift from the river.

125. The area taken up was stated to measure 42 bighas; as the side next the river was cut away a good deal by it during the rains, a resurvey was made in May last and the area found to be 38 bighas 13 biswas 7 biswansis, showing a loss of nearly 4 bighas.

126. As soon as the land was made over, the erection of a substantial fence was commenced. This, I need scarcely say, was most necessary in order to exclude cattle and goats which could not for a moment be tolerated when 40 young trees were being raised, as all sides, except for a short distance, were open, enclosing the site was a matter of some labor and expense. The total length of fence erected was 1,266 yards, it is made of earth and planted with a row of aloes on the top.

127. To avoid losing a season, seeds of a few kinds, *viz.*, *eucalyptus*, *peepul*, and *goolar* were sown in the Horticultural Garden some time before the land for the nursery was available. By this arrangement much time was gained, as by the commencement of the rains a stock of seedlings of each was ready to plant out. The plants of *E. rostrata* grew so rapidly that a number were ready to send out the same year, and several hundreds of *goolar* will be sufficiently strong to plant out during the coming rains.

128. The kinds of trees and numbers of each raised during the year are—

Mango ...	27,750
Tamarind ...	5,800
Mowha ...	5,300
Goolar ...	6,500
Jack fruit ...	406
Bahera ...	190
Eucalyptus rostrata ...	770
Ditto resinifera ...	250
Jaman ...	13,275
Pakar ...	400
Peepul ...	5,300

Total number raised of all kinds is 65,941. Two hundred plants of *eucalyptus* were sent to the Deputy Commissioner of Unao.

Permanent plantation.

129. In addition to nursery work, it was intended to use part of the land taken up for trial plantations of exotic trees. These trials are intended in some cases to test the hardiness of the trees and ascertain their value as food or fodder producers, &c.; others are planted in order to supply seed.

During the year the following were planted :—

Owenia cerasifera (sweet plum) ...	4
Rhus Thunbergii ...	20
Swietenia mahoganii (mahogany) ...	20
Pterocarpus marsupium ...	4
Antidesma dalladyana ...	4
Spathodea campanulata ...	2
Fraxinus pubescens ...	4
Mallotus Phillipensis ...	4
Eucalyptus resinifera ...	21
Ditto rostrata ...	16
Pithecolobium Saman ...	69
Arabian date palms ...	24

The tops of pithecolobiums were killed by frost, but they have thrown out several vigorous shoots from below and again promise well. The others call for no special notice.

130. The arrangements for irrigating the nursery were, planned, by Mr. Wilson, C. E., and carried out in accordance with his instructions. I am glad to say they have worked admirably, giving an abundant supply of water all through the hot weather; the water used was raised from the river by means of two chain pumps or McComa's waterlifts, made and supplied from Roorkee Workshops. They have worked most satisfactorily, only requiring new leathers occasionally, which a village carpenter and chamar were equal to supplying. The area irrigated from one pump in an average working day by three men was found to be about half an acre, the lift ranged from 12 to 16 feet, and the water had to flow some distance in a raised drain, where some loss resulted by percolation. Irrigatio.

Owing to the uneven character of the ground, raised watercourses were required in order to get the water to all parts of the nursery; and to prevent the percolation just mentioned, half round glazed tiles were made use of to line the waterchannel with; they proved very useful, but are not altogether satisfactory.

131. Since January four boys have been entertained as apprentices. They will be trained in the raising and tending of young trees, and when proficient will be sent out to take charge of small district nurseries. Training of malles arboricultural nurs

132. The total amount expended on the nursery during the year was Rs. 2,171-15-11. Expenditure on arbo cultural nursery.

These figures are owing in a great measure to such permanent works as the erection of a fence, tool shed, watercourses, and purchase of pumps, which will not occur again, at least not yearly.

A detailed statement of expenditure is given at the end of this report.

V.—Financial Results.

133. The total estimated receipts for 1879-80 amounted to Rs. 10,000. The total actual receipts amounted to Rs. 13,200-0-3, showing a surplus of Rs. 3,200-0-3. Budget.

The total estimated expenditure for the year amounted to Rs. 10,000 and the total expenditure was Rs. 13,200, or Rs. 3,200 over the estimate. Of this excess, Rs. 1,200 were transferred to the Cawnpore Farm, so that the excess expenditure on account of the Horticultural Garden was Rs. 2,000 only.

134. The Government grant of Rs. 4,000 was drawn in full. Government grant.

135. There was no difference in the interest on Government notes. Details of increase or decrease over budget estimate.

The receipts from lease of land were more by Rs. 126-13-0.

The receipts from 1st and 2nd class subscribers were less by Rs. 132. This frequently occurs, owing to transfers and absence of subscribers on leave, &c.

The sale of garden produce, as per details below, amounted to Rs. 7,312-5-10, showing an increase of Rs. 2,780-5-10 over last year's receipts for the same produce.

	Rs.	a.	p.
Plants	3,017	11	6
Acclimatized seeds	1,164	3	0
Imported seeds	1,472	1	0
Fruit	1,306	2	0
Wood	10	4	0
Vegetables	193	8	8
Grass	37	7	0
Cut flowers	211	0	8

The receipts on account of miscellaneous things were more by Rs. 924-13-5.

136. The total receipts from all sources show an increase over those of last year of Rs. 398-9-10. Increase of receipts over last year.

A detailed statement of receipts and expenditure, drawn up according to the revised budget headings, is attached to this report.

seedsmen.

137. Messrs. Landreth and Sons, Philadelphia—

	Dol.	c.
Balance in favor of Horticultural Garden	4	20
Remitted in 1879-80	233	27
Total ...	237	47
Their bill for seeds	233	66
Balance in favor of Horticultural Garden	3	81

Messrs. Sutton and Sons—

	£.	s.	d.
Balance in favor of Horticultural Garden	2	2	6
Remitted in 1879-80	17	0	0
Total ...	19	2	6
Their bill for seeds	17	2	1
Balance in favor of Horticultural Garden	1	10	5

Subscribers.

138. The number of subscribers during the past year was—

First class	10
Second do.	9

VI.—Miscellaneous.

Training of mallees.

139. The training of native boys as mallees has been continued (but not without considerable interruption) during the year: 16 boys were in the garden at the beginning of the year. Of these, one left and another was dismissed. The first was in the garden about a year and seemed to make fair progress, the work, however, did not prove quite to his mind and he asked permission to leave, giving as his reason for doing so the offer of service elsewhere as a chaprasi. The other had been in the garden over two years, but as he was continually quarrelling with one or other of the men in the garden he had to be dismissed. Nearly all the boys suffered more or less from the fever which prevailed at the beginning of the cold weather. Some of the older boys were laid up for months : on this account their progress has not been so good as I could wish ; still fair progress has been made, and given sufficient time for their proper training, I feel confident some, if not all, will turn out well. As yet none have been sufficiently trained to send out in charge of gardens. Those who have been longest in the garden are very useful hands, and quite earn their wages at such operations as budding and grafting, &c.

Horticultural show.

140. The annual horticultural show was held on the 9th of March. The date proved to be rather late, hot west winds having set in a few days before ; the display of flowers and flowering plants was in consequence not quite so good as usual. Vegetables, however, were well represented, the competition in some classes being very large and in most good quality was the rule.

There was a marked increase both in number and quality of the collections of plants from private gardens ; compared with former years, much progress was shown to have been made in this branch.

Beyond strawberries, which were unusually fine, the fruit exhibited calls for no remarks. March is not a fruit season, hence the display is always poor.

The accounts of the show are as follows :—

RECEIPTS.

	Rs.	a.	p.
Balance from last year	251	14	5
Contributed by European and native gentlemen ...	149	0	0
Ditto by the municipality of Lucknow ...	50	0	0
Realized by sale of tickets	61	4	0
Total	512	2	5

EXPENDITURE

	Rs.	a.	p.
Distributed in prizes	217	8	0
Printing schedules and tickets	21	0	0
Miscellaneous expenses	14	13	6
Balance with Deputy Commissioner	258	12	11
Total	512	2	5

141. In May it became necessary to put a new roof on the bullock shed, the wooden supports of the old one having given way in a gale, letting down the roof. In place of wooden supports and a thatched roof, brick-pillars and a substantial tiled roof have been substituted, the floor also was put into thorough order by a good layer of old mortar well rammed down. Brick pillars were also erected to support the roof of the potting shed. Buildings and improvements.

142. A feature of a pleasing character has been added to the garden by the erection of an iron and wire arch over a long walk (600 feet). The iron supports are placed at intervals of 8 feet; through these at intervals of 12 inches galvanized wires are run, these are intended to support the climbing roses planted on each side of the walk for the purpose of being trained over the trellis.

143. The platform and pillars were added to a well commenced by Dr. Bonavia, and which till this year remained unfinished.

144. In May nearly all the bullocks suffer from foot and mouth disease, which was prevalent in the neighbourhood at that time. Cattle disease.

In September rinderpest appeared, and, I much regret to state, proved fatal to two of the garden bullocks.

145. The following seeds have been received during the year :— Seeds received.

From the Superintendent, Botanical Garden, Bangalore—

Calyeaccion longifolium.	Ipomœa dissecta
Guizotia oliefera.	Begonia ulmifolia.
Gauzuma tomentosa.	Ipomœa campánulata.
Bignonia xylocarpa.	Colesia, mixed.
Cassia alata.	Albizzia amara.
Bauhinia purpurea.	Asparagus sermentosus.
Ipomœa coccinea.	Agati grandiflora.
Begonia argentea maculata.	Ardisia crenulata.
Caryota furfusa.	Allamanda nerifolia.
Cassia florida.	Hæmatoxylon Campechianum.
Albizzia stipulata.	Poivrea coccinea.

From the Superintendent, Botanical Garden, Saháranpur—

Pithecolobium saman.	Eucalyptus Ballyana.
Cordia myxa.	Ditto Stuartiana.
Schlichira trijuga.	Acacia cyanophylla
Cupressus funebris.	Casuarina stricta.
Ditto sempervirens.	Frenela rhomboidea.
Catalpa bignonioides var. speciosa.	Acacia pyracantha.
Panax elegans.	Ditto melanoxylon.
Eucalyptus amygdalina.	Sterculia diversifolia.
Ditto maculata.	A collection of acclimatized vegetable seeds.
Ditto aemenoides.	

From the Superintendent, Botanical Garden, Calcutta—

Corypha elata.
Licuala peltata.
Ditto spinosa.
Ptychosperma splendens.
Oreodoxia regia.
Caryota urens.
Sabal Palmetto.
Swietenia mahoganii.
Bambusa stricta.
Ditto Brandisii.
Areca Madagascarensis.
Pandanus furcatus.
Calamus caltida carpus.
Phoenix paludosa.

From Mr. Pirie, Lucknow—

Runga sem.
Mukhun Ditto.
Acroclinium roseum.

From Mr. Bartlett, Calcutta—

Cochlospermum gossypium,

From Secretary, Agri.-Horticultural Society, Central Provinces, Nagpur—

Poinciana regia.

From Secretary, Agri.-Horticultural Society, Madras—

Grevillea robusta.

From Superintendent, Botanical Garden, Ganesh Khind—

Poinciana regia 2lb.

From Baron Von Müeller, Government Botanist, Australia—

Eucalyptus Alpina.
Ditto piperita.
Ditto hæmastoma.
Ditto tereticornis.
Ditto botryoides.
Eucalyptus Liberii
Ditto Lehmann.
Ditto capitellata.
Ditto pilularis.

From Director, Department, Agriculture and Commerce, North-Western Provinces and Oudh—

3 kinds of maize.
Argan tree (argania sideroxylon).

From Mr. Beck, Cashmere.—

A collection of 140 packets of various seeds.

From Honorary Secretary, Queensland Acclimatization Society.—

Panax elegans.

By purchase.

From Mr. Creswell, Melbourne.—

Eucalyptus corymbosa.
Ditto undulata (swamp gum).
Ditto coronocalyx.
Angophora lanceolata.
Cordyline stricta.
Podocarpus spinulosus.
Doryanthes excelsa.
Wilkea calyptrocalyx.
Coprosma lucida.
Brachychiton populneum.
Grevillea Hilli.
Ditto linearis.
Ditto Bankii alba.
Ditto longifolia.
Ditto sericea.
Ditto robusta.
Ditto macrostylis.
Dracœna terminalis.
Ditto cannœfolia.
Macrozamia spiralis.
Areca sapida.
Acmena pendula.
Areca monostachya.
Calamus Australis.
Acacia cultriformis.
Ditto suaveolens.
Duboisia myoporoides.
Daviesa ulicina.
Passiflora Banksii.
Alchornea ilicifolia.
Hibbertia volubilis.
Passiflora cœrulea.
Kennedya rubicunda.
Billardiera scandens.
Panax jambucifolia.
Smilax glycyphylla.
Casuarina tennussimus.
Hakea gibbosa.
Melaleuca necrophylla.
Phormium Chelsonii.
Swansonia coronillœfolia.
Doryanthes Palmierii.
Sanundra Fortuniana.
Acacia sp.
Psidium pommiferum.
Phormium tenax variegata.
Hibiscus splendens.
Boronia megastigma (presented).

From Secretary, Agri.-Horticultural Society of India—

A collection of 25 kinds of flower seeds.

From Herr Friedrich Adophe Hogge, Erfurt—

A collection of 16 kinds of flower seeds.

From Superintendent, Jail, Fyzabad—

One seer of seed of indigenous jute.

From the Superintendent, Public Gardens, Allahabad—

A collection of balsam and other seeds.

146. From the Superintendent, Government Garden, Bangalore—

Agapanthus umbellatus.
Eucharis grandiflora.
Amaryllis, 4 new and 4 old kinds.

From Messrs. Stanley Price and Co., Calcutta—

A collection of caladiums and achimenes.

From the Superintendent, Botanical Garden, Saháranpur—

30 plants pithecolobium saman.
20 mahogany trees.
20 Rhus Thunbergii.
27 Fruit trees of sorts.

From Captain Home, Dinapur—

2 plants of Moreton Bay chestnut.

From Major Juskarun Singh of Bulrampur estate—

2 sital chini.
1 soya.
A basket of orchids.

From Agri-Horticultural Society of India, by purchase—

A collection of fruit trees.
Ditto of plants.
Cuttings of 10 kinds of peach.
Ditto of 1 kind of lime.

From Superintendent, Public Gardens, Allahabad—

Cuttings of 8 kinds of roses
Ditto 7 kinds of peach.

From Mr. Nicholson, Mirzapur—

Cuttings of a late peach.

From Mr. Millett of Lucknow—

9 kinds of achimenes.

From Mr. Martin, Naini Tal—

A basket of ferns and orchids.

From Major Swetenham, Indore—

Cuttings of 14 kinds of roses.

From Superintendent, Taj Garden, Agra—

12 kagzie limes.
2 biota compacta.
2 ditto aurea.

From Mr. Berill, Gorakhpur—

A collection of plants.

147. To Agri-Horticultural Society, Madras— Seeds sent out *gratis*

5 kinds eucalyptus seed.

To Superintendent, Botanical Garden, Saháranpur—

A packet of *eucalyptus* Alpina.
3 kinds cabbage seed.

To Superintendent, Botanical Garden, Ganesh Khind—

A collection of tree seeds.

To Captain Marshall, Chumba—

A collection of tree and fruit seeds.

To Agri-Horticultural Society, Panjáb, Lahore—

A packet of red *putwa* seed.
Ditto gooseberry seed.

To J. Beck, Esq., Cashmere—

A packet of *eucalyptus* seed.
A collection of vegetable seeds.

To E. Tidmarsh, Esq, Graham's Town, Natal—

A packet of *reana* seed.

To Superintendent, Botanical Garden, Natal—

A packet of *reana* seed.

To Jules de Cock, Esq., Ghent—

1 packet of cotton seed.
2 ditto palm seed.

To Captain Cattania, Nizam's Railway Forest, Dharwar—

8 kinds of *eucalyptus* seed.

To Major Mathews, Agra—

A packet of Cape gooseberry seed.

To Captain Home, Dinapur—

A collection of flower seeds.

To Acclimatization Society of Queensland—

A collection of tree seeds.

To Mr. Parsons, Ajmere—

4 kinds *eucalyptus* seed.

To Mr. Vincent, Lahore—

8 kinds *eucalyptus* seed.

M. RIDLEY,
Supdt., Hort. Garden, Lucknow.

Abstract of expenditure of the Arboricultural Central Nursery, Lucknow, for the year 1879-80.

Number.	Expenditure.	Amount. Rs.	a.	p.
1	Gardeners and assistants	340	6	9
2	Variable labor	635	7	0
3	Purchase of manure	84	4	6
4	Ditto seeds and plants	55	1	0
5	Irrigation	985	15	5
6	Miscellaneous	70	13	3
	Total ...	2,171	15	11

LUCKNOW:
The 3rd July, 1880.

M. RIDLEY,
Supdt., Hort. Garden.
In charge Arboricultural Nursery, Lucknow.

Abstract of the Horticultural Garden Accounts for 1879-80, *commencing from* 1*st April*, 1879 *to* 31*st March*, 1880.

Number.	Receipts.	Amount.	Total.
		Rs. a. p.	Rs. a. p.
1	Interest on Government notes	108 0 0	
2	Rent of land	376 13 0	
3	Subscriptions	348 0 0	
4	Sale of garden produce	7,342 5 10	
5	Miscellaneous	1,024 13 5	9,200 0 3
	Provincial Grant ...	...	4,000 0 0
	Expenditure Grant ...	...	13,200 0 0
	Saving ...	...	0 0 3
	Total ...	...	13,200 0 3

Number.	Disbursements.	Amount.	Total.
		Rs. a. p.	Rs. a. p
1	Superintendent	1,500 0 0	
2	Writers and others	360 0 0	
3	Gardeners and assistants	1,822 14 0	
4	School for native gardeners	492 12 3	
5	Variable labor	1,276 9 9	
6	Purchase of seeds and plants and carriage	2,333 2 4	
7	Ditto of dead and live-stock	398 8 6	
8	Ditto of manure	117 4 6	
9	Construction and repairs	593 8 6	
10	Service Stamps	163 8 6	
11	Miscellaneous	2,941 11 8	
12	Transferred to Cawnpore	1,200 0 0	13,200 0 0
	Balance Treasury ...	...	0 0 3
	Total	...	13,200 0 3

LUCKNOW:
The 3rd July, 1880.

M. RIDLEY,
Supdt., Hort. Garden, Lucknow.

ORDERS OF GOVERNMENT.

No. 1766 of 1880.

From

The SECRETARY to GOVERNMENT,

N.-W. Provinces and Oudh,

To

The DIRECTOR of AGRICULTURE and COMMERCE,

N.-W. Provinces and Oudh.

Dated Naini Tal, the 18th October, 1880.

Sir,

Revenue Dept.

I am directed to acknowledge your letter No. 484A., dated the 1st September last, with which you submitted the annual report on the Horticultural Gardens, Lucknow, for the year ending 31st March, 1880.

2. The report is drawn up under the five main heads suggested by Mr. Buck last year, *viz.*,—

I.—Fruit culture.
II.—Vegetable and farm culture.
III.—Flower culture.
VI.—Arboriculture.
Each of the above heads being divided into—
(*a*) Improvement of indigenious or acclamatised kinds;
(*b*) Introduction of new kinds ;
(*c*) Distribution.
V.—Financial results.

3. You remark that you have submitted Mr. Ridley's report in print as it is full of information, valuable to all who are interested in the subject of which it treats, and because, in your opinion, the interchange of reports, showing results and suggestions that must occur during the practical working out of experimental horticulture or arboriculture, is the best way of utilising the material thus provided at considerable cost. The report is a concise, clear, and excellent production, and presents in a small compass a summary of what has been attempted and achieved, which cannot fail to be useful to all that are interested in his operations. His Honor fully agrees that it should be printed and circulated. You further advocate the interchange of visits between the Superintendents of Gardens, in order that they may see what is being done by each other, but remark that there are difficulties in the way of travelling allowances. The suggestion seems a good one, as far more could be learned from personal inspection than from a mere perusal of reports. Provision for travelling allowance, which should, of course, be only sufficient to cover bare expenses, may be made in the budget for one visit in the year at whatever time you may think best.

4. You have briefly noticed the results which are described in the report. Under I., experiments were made with oranges, vines, peaches, *olu bokhara*, *alucha*, mangoes, *bers*, and strawberries. Six new kinds of mangoes were received from the Agri-Horticultural Society of India,

also *leechees*, limes, chestnuts, pine-apples, &c., from other sources. From the table given in para. 51, mangoes would appear to be the most profitable crop, giving a net return of Rs. 168 per acre, while peaches come next with a profit of Rs. 114 per acre. Vines, *leechees*, Malta and Mandarin oranges did not repay the cost of cultivation. One thousand six hundred and thirty fruit trees were sent out during the year ; 804 were sold for Rs. 381-9-0; 719 were sold at half-price to public gardens; and 107 were distributed gratis. The demand is increasing, especially for mangoes and oranges, and it is expected the distribution next year will be considerably greater. This is a proof that the gardens are doing really useful work which is appreciated by the public.

5. Under II., the trials commenced last year of sowing imported vegetable seeds in the rains were continued with slightly better results; but the practice cannot yet be recommended for general adoption. Potatoes from hill-seed were found to be superior to those from Jaunpur and Lucknow seed in size and appearance, and also in quality and flavor; but the latter yielded by far the greatest outturn, and was the most profitable crop,

In para. 7 of your letter you remark that the success of the acclimatised seed , whether vegetable or fruit, is now beyond question: This however is directly opposed to the opinion expressed by Mr. Gollan at Sahárunpur. Portugal cabbage, two new kinds of tomatos from Messrs. Sutton and Sons, and two new kinds of country vegetables were introduced during the year. Rs. 242 were realised by the sale of acclimatised, and Rs. 1,472 by the sale of imported, vegetable seeds.

6. Under III., a large number of flower annuals have been successfully acclimatised; and the sale of seeds, which were sent to all parts of India, was very large, bringing in no less than Rs. 932 Eleven new exotic annuals were introduced, and some fifty or sixty shrubs and plants added to the garden collection. Three thousand eight hundred and eighty-one ornamental trees and plants of sorts were sold, and 1,904 distributed gratis, making 5,785 in all: 1,224 rose plants and 536 cuttings of sorts were sold, and 65 of the former and 511 of the latter distributed gratis.

7. IV.—You express yourself fully satisfied with the arboricultural nursery, which you say may be accepted as a model of its kind. Now that arboricultural operations are entirely under your department, there should be no difficulty in getting trees distributed as soon as they are ready to be planted out · The *Inga dulcis* is likely to prove a success as a fodder and shade-producing tree, and is being distributed as widely as possible. The total number of trees of all kinds raised during the year was 65,941, of which 27,750 were mangoes. Experiments are also being made with exotic trees, either to ascertain their suitableness to the climate and their value as food or fodder, or to obtain seed. The arrangements for irrigation made by Mr. Wilson have proved highly successful. The total amount expended on the nursery was Rs. 2,172, a great part of which was on permanent works and in the nature of fixed capital.

8. V.—The receipts for 1879-80 were estimated at Rs. 10,000, but actually amounted to Rs. 13,200, or Rs. 399 in excess of those of the previous year. The expenditure was Rs. 13,200, of which, however, Rs. 1,200 were transferred to the Cawnpore Farm. Financially, the results are very favorable.

9. VI.—The training of *malis* has been continued. Sixteen boys were in the garden at the beginning of the year, of whom one left and one was dismissed. Fair progress is said to have been made, but none are yet sufficiently trained to be sent out in charge of gardens. This is a most important branch of the Superintendent's duties, and one which he should not lose slight of.

10. You express a high opinion of Mr. Ridley's services in connection with the gardens. Mr. Ridley deserves commendation for his successful management and for the highly satisfactory state of the gardens and nurseries under his charge.

11. The report will be published in the *Gazette* as usual.

I have the honor to be,

SIR,

Your most obedient servant,

C. ROBERTSON,

Secy. to Govt., N.-W. P. and Oudh.